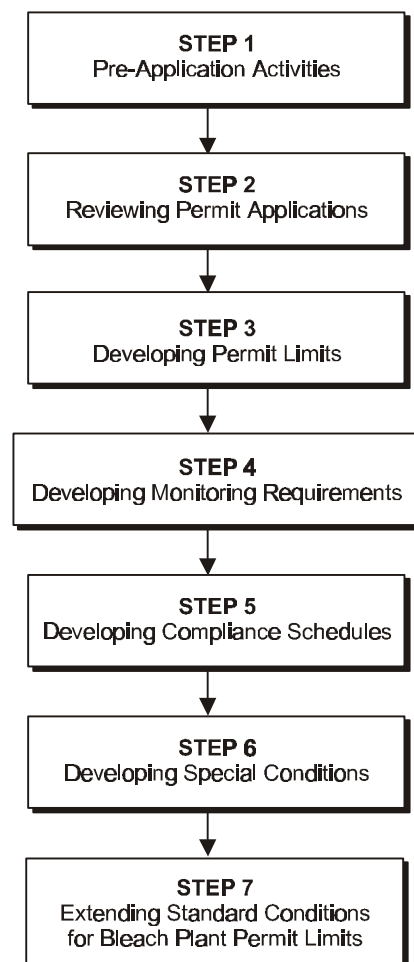
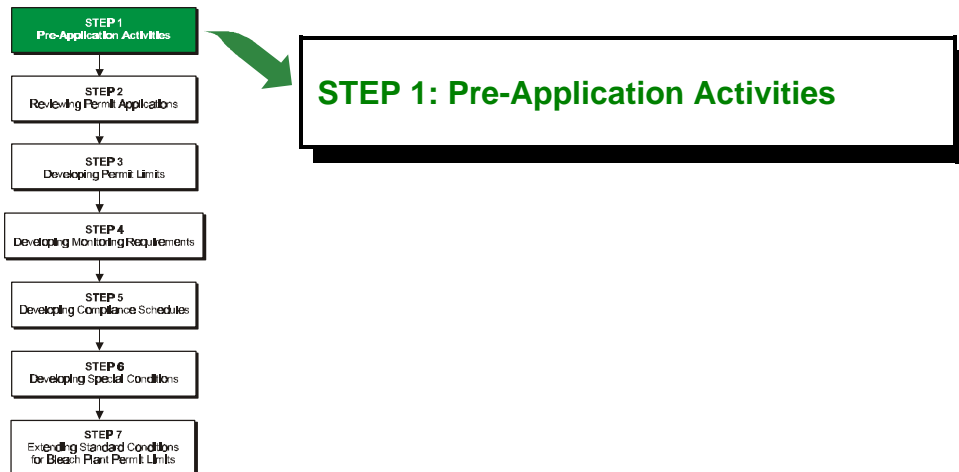


8

How Do I Develop Permits for Mills with Operations in Subparts B and E?

This section discusses the step-by-step process of establishing permit limits using ELG&S for mills with operations in Subparts B and E. The discussion covers the following topics to aid you in establishing permits:

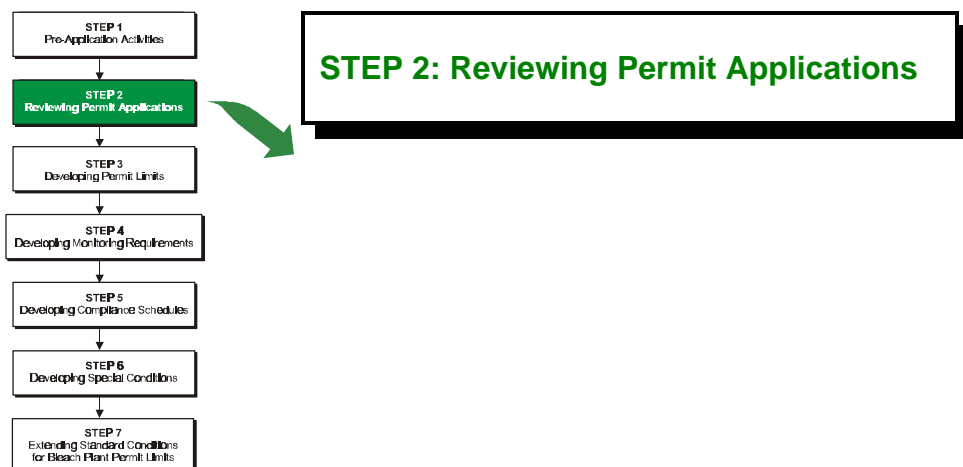




Pre-Application Activities

Before a permit application is submitted by a mill, the permit writer should work to become familiar with the mill's situation, its personnel, and its compliance status. These pre-application activities could include the following:

1. Reviewing the mill's current NPDES permit, supporting record, and compliance history.
2. Developing an effective relationship with mill personnel and corporate officials who complete the application and provide supplemental information needed to finish a draft permit. This can be started by setting up meetings with mill officials before an application for a permit is submitted to discuss the mill's current compliance, current mill operations, and new standards or limitations that will be incorporated in the new permit. These meetings will be critical in supporting a timely completion of the draft permit and in Agency preparation for any legal response that may be expected from the applicant if the permit conditions are not to their liking.
3. If an Agency lacks permit experience, then a mill visit by the permit writer is strongly suggested so that the site operations are understood "first hand" and so that information from the visit can be used by the permit writer in the permit preparation.



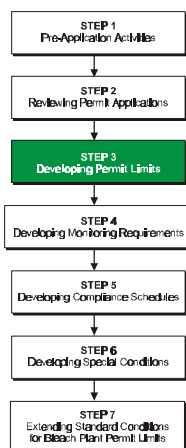
Reviewing Permit Applications

All mills that discharge process wastewaters into receiving streams must submit the following forms when applying for an NPDES permit:

1. Form 1, which includes basic mill information and the SIC codes for the products manufactured; and
2. Form 2C (existing sources) or Form 2D (new sources), which includes outfall information, flow information or projections, and production information or projections.

These forms, if completed properly, should provide most of the information necessary for establishing NPDES permits for mills. The two forms, however, are generic for all facilities with manufacturing, commercial, mining and silvacultural operations (see the U.S. EPA NPDES Permit Writer's Manual (EPA-833-B-96-003) for more information about NPDES permit application forms). For pulp and paper mills, you may need additional information to issue appropriate permits. Two issues that you must be aware of when reviewing permit applications include:

1. 40 CFR 430 has been reorganized so the subparts address similar processes, and not by products manufactured (see Section 3). On the permit applications, however, mills note SIC codes of the products manufactured, not mill processes. If the mill's processes are difficult to identify, you may need to contact the facility to accurately identify process operations. To help you identify the applicable ELG&S for existing direct dischargers, you may refer to Appendix A which lists all existing mills with operations in Subparts B and E (the appendix also indicates whether the mill performs operations that are covered under other subparts).
2. The amount of final product manufactured is not sufficient for establishing some permit limits. Required production information is described in more detail below.



STEP 3: Developing Permit Limits

- What are the Two Types of ELG&S?
- How Do I Use Production Information to Develop Permit Limits?
- What Production Definition Must Be Used to Calculate AOX and Chloroform Limits?
- What Production Definition Must Be Used to Calculate Conventional Pollutant Limits?
- How Do I Calculate the Production Rate?
- How Do I Determine Whether the Mill is Subject to the Specialty-Grade Segment of Subpart E?
- Should the Permit Include Limits Based on ELGs or WQBELs?

Developing Permit Limits

As part of the permit process, you must apply the ELG&S developed by EPA to establish numerical permit limits for mills. Note that permits may also include WQBELs (see section 2); however, this document focuses on the development of permit limits based on ELG&S for the pulp and paper industrial category.

What are the Two Types of ELG&S?

After reviewing the permit application and determining the application is complete, you must establish numerical permit limits for pollutants regulated by ELG&S. Some of the ELG&S are mass-based while others are concentration-based (see Table 8-1). Concentration-based ELG&S are simply the allowable pollutant concentration in a regulated effluent stream, and are independent of a mill's production. For those pollutants that are concentration-based, you must include the concentration value of the ELG&S for the pollutant as the permit limit. Mass-based ELG&S are expressed as an allowable mass of pollutant discharge per unit of production and are directly related to a particular mill's production.

Alert! It is important to obtain accurate production information to establish permit limits for mass-based ELG&S.

Table 8-1
Concentration- or Mass-Based ELG&S

Pollutants	Units	Concentration-Based	Mass-Based
2,3,7,8-TCDD	pg/L	✓	
2,3,7,8-TCDF	pg/L	✓	
Chloroform	g/kg		✓
12 chlorinated phenolic pollutants	ug/L	✓	
AOX	kg/kg		✓
COD	Reserved	Reserved	Reserved
BOD ₅ (for direct dischargers)	kg/kg		✓
TSS (for direct dischargers)	kg/kg		✓
pH (for direct dischargers)	pH units	NA	NA

NA = Not applicable for this pollutant

How Do I Use Production Information to Develop Permit Limits?

For pollutant limits that have mass-based ELG&S, you must first identify the mill's appropriate production rate, and then multiply that rate by the mass-based limit to determine the permit limits (the allowable mass of pollutant in a mill's bleach plant or final effluent).

Alert! Production is defined as off machine tons for BOD₅ and TSS limits, but as air-dried tons of unbleached pulp entering the bleach plant for AOX and chloroform limits.

Note that there are two production definitions, one used to determine permit limits for AOX and chloroform and another used to determine permit limits for conventional pollutants. This section discusses the difference between the two production definitions and demonstrates how to determine appropriate production rates.

What Production Definition Must Be Used to Calculate AOX and Chloroform Limits?

For AOX and chloroform, EPA defines production as “. . . the annual unbleached pulp entering the first stage of the bleach plant divided by the number of operating days during that year.” The unbleached pulp must be measured in air-dried metric tons (air-dried means 10% moisture) of brown stock pulp entering the bleach plant at the stage where chlorine or chlorine-containing compounds (i.e., chlorine dioxide) are first added. For mills that use TCF bleaching, unbleached pulp production must be measured as the amount of brown stock pulp entering the first stage of the bleach plant from which wastewater is discharged (see 40 CFR 430.01(n)).

Note that mills typically measure the *amount of bleached pulp* that exits the bleach plant, and not the *amount of brown stock pulp* that enters the first stage of the bleach plant. These are two

different values; the amount of pulp leaving the bleach plant is less than the amount of pulp entering the bleach plant because a certain amount of pulp is lost during the bleaching process. This pulp loss is known as bleaching “shrinkage.” Bleaching shrinkage depends on the fiber furnish (i.e., hardwood versus softwood), bleaching process operations (i.e., oxygen delignification, types of bleaching chemicals) and chemical application rate (i.e., greater amount of chemical use results in greater shrinkage).

Most mills know the bleaching shrinkage value associated with their process. You may require the mill to report the amount of brownstock pulp entering the bleach plant, or use the bleaching shrinkage value provided by the mill to calculate that amount. If the mill doesn’t know the bleaching shrinkage, you can estimate bleaching shrinkage by referring to Table 8-2, which presents bleaching shrinkage values used by paper industry engineers for design and analysis. Mills will typically measure bleached pulp in terms of air-dried metric tons (ADMT) or air-dry tons (ADT), standard units of measure in the pulp and paper industry defined as 10% moisture. Therefore, you will not have to adjust the production to 10% moisture content.

Table 8-2: Typical Bleaching Shrinkage Factors*

General Bleaching Process	Hardwood	Softwood
Chlorine-Based or Chlorine Dioxide-Based Bleaching Sequence	4%	8%
Oxygen Delignification + Chlorine-Based or Chlorine Dioxide-Based Bleaching Sequence	4%	8%
Extended Cooking + Chlorine-Based or Chlorine Dioxide-Based Bleaching Sequence	2%	4%
Extended Cooking + Oxygen Delignification + Chlorine-Based or Chlorine Dioxide-Based Bleaching Sequence	2%	4%

*Source: BAT Cost Model Support Document. Prepared by Radian Corporation for EPA, 1996. Pulp, Paper, and Paperboard Rulemaking, Section 23.1.2, DCN 13593.

What Production Definition Must Be Used to Calculate Conventional Pollutant Limits?

For conventional pollutants, production is defined as “. . . the annual off-the-machine production (including off-the-machine coating where applicable).” Note that coatings and other additives (e.g., clay, pigments, sizing, strengthening agents) may account for 10 to 40% of a final paper product’s weight. The production definition for conventional pollutants *includes* the weight contributed by coatings and additives. For those mills that produce pulp as the final product (i.e., “market” pulp), the definition of production for conventional pollutants is that amount of pulp “. . . measured in air-dry tons (10% moisture)” (see 40 CFR Part 430.01(n)).

As part of business operations as well as permit requirements, mills record production of all final products. Paper products are typically measured in OMMT or OMT, which is consistent with the production definition for conventional pollutants. Mills that manufacture market pulp typically measure this product in terms of ADT with 10% moisture content, which is consistent with the

production definition for conventional pollutants. You may find that some mills report market pulp production with variable moisture content. If so, you must either obtain the pulp moisture content information from the mill, and then normalize the pulp production to 10% moisture content, or require the mill to do so.

Table 8-3 lists production measures common to the pulp and paper industry.

Note: You should review product information submitted by existing direct discharges because you may find they have increased or decreased production or they manufacture new products.

Table 8-3: Common Production Measures in the Pulp and Paper Industry

Production Measure	Metric Units	Notes
Off-the-machine	OMMT	Used when measuring final paper product. Regulatory definition does not specify standard moisture content. Moisture content is variable for final paper products. Typical moisture content is 7% ($\pm 2\%$).
Air-dry	ADMT	Standard industry term, defined as 10% moisture content. Typically used when measuring market pulp or bleached pulp production.
Oven-dry	ODMT	Standard industry term, defined as 0% moisture content.
Bone-dry	BDMT	Old term for oven-dry.

T - English ton.

MT - metric ton.

Note: 1 ton = 0.907 metric ton.

How Do I Calculate the Production Rate?

The production rate is determined by dividing the annual production in metric tons by the number of operating days during that annual period.

EPA has established general permitting regulations at 40 C.F.R. §122.45(b) that specify a production rate calculation method that you may use to determine permit limits for pollutants that have mass-based EG&S. Applying that method, however, may result in different permit limits than those derived using the method outlined in the definition of production described above. Because the general permitting regulations serve a general purpose, you should use the definitions described above, which specifically refer to establishing permit limits for pulp and paper mills.¹

¹Applying the production rate calculation method in 40 CFR Part 430, instead of the analogous provisions in Part 122 in this situation, is consistent with the principle of statutory and regulatory construction that the more specific requirements takes precedence over the more general one. Moreover, 40 CFR §122.44(a) specifically requires each NPDES permit to include permit limits based on ELG&S promulgated by EPA under CWA Section 301 (e.g., BAT) and CWA Section 306 (e.g., NSPS). The ELG&S in Part 430 are premised on the use of the term “production” as defined in 40 CFR §430.01(n). Therefore, calculating permit limits for pollutants with mass-based ELG&S using §122.45(b) instead of §430.01(n) would be inconsistent with both Part 430 and, by extension, §122.44(a).

Using the definitions of production specified in 40 CFR 430.01(n), you must determine production rate based on “past production practices, present trends, or committed growth.” This means that the production rate should be based on past and/or projected mill data. As a part of their permit applications, mills should be asked to provide monthly production and the corresponding number of operating days data for the five years prior to the expiration of their current permit. If monthly production data is not available, you can also use the annual production data and the corresponding number of operating days for the five years prior to the expiration of their current permit.

The pulp and paper industry operates 24 hours per day, seven days per week. Most mills only have shut downs during scheduled maintenance periods or if market conditions require a mill to stop production for a period of time. Scheduled maintenance shut downs typically occur once or twice a year. Therefore, the number of operating days per year to use in determining production rate is the number of days during the year minus maintenance shut downs and any special market-driven shut downs (e.g., a typical mill’s operating days per year will be about 350).

You should calculate permit limits based on the maximum 12-month production demonstrated by the facility over the last five years. The maximum 12-month production can be calculated either as the maximum rolling 12-month production over the last five years or as the maximum yearly production over the last five years. If a facility has papermaking operations that are completely independent of pulp operations, then there may be cases where you would calculate permit limits using different 12-month maximum production dates.

You must ensure that the mill provides (or calculates using bleaching shrinkage) unbleached kraft pulp production for each bleach plant, in order to establish the appropriate permit limits for chloroform (and AOX for indirect dischargers). You may find that some complex mills operate as many as four bleach plants. In this case, you must use four production rates, one for each bleach plant.

In certain circumstances, you will find that evaluating the production rate using the suggested method is not appropriate. Some mills may have recently changed operations (e.g., a mill installed a new paper machine within six months of permit reissuance). In these cases, you should only use data that reflect recent operation. Other mills may plan to change operation during the term of the permit (e.g., a mill plans to reduce or increase bleaching operations or to retire or add a paper machine). For those mills, you may establish multiple sets of limits based on tiered production values that reflect current and projected mill operation.

Three examples of how to determine production are presented below.

Example 1: Mill A produces bleached kraft pulp to manufacture fine papers. The mill operates one bleach plant to produce the bleached pulp and one paper machine to manufacture fine papers. Upon reviewing the mill's production data, you find that over the past five years, the sum of their bleached kraft production and fine paper production peaked between June 1996 and May 1997. The raw data during this time period is as follows:

Date	Bleached Kraft Pulp Production (ADMT/mo)	Fine Paper Production (OMMT/mo)
June 1996	22,900	27,900
July 1996	23,000	27,800
August 1996	23,200	28,000
September 1996	22,700	27,700
October 1996	29,400	27,600
November 1996	29,000	27,600
December 1996	12,000	27,300
January 1997	22,800	28,100
February 1997	22,300	27,900
March 1997	22,900	29,000
April 1997	22,600	27,350
May 1997	23,000	27,300
Total (ADMT or OMMT/ year)	275,800	333,500
Total Operating Days/Year	350	350
Total (ADMT or OMMT/day)	788	953

Mill A provided an 8% shrinkage factor for the bleached papergrade kraft pulp production data submitted with their permit application. Based on this information, calculate the production rate for AOX and chloroform as follows:

$$788/(1-0.08) = 857 \text{ ADMT of unbleached papergrade kraft pulp entering the bleach plant.}$$

The production rates for Mill A are as follows:

Production Rate for AOX and Chloroform	857 ADMT
Production Rate for Conventional Pollutants that Result from Fine Paper Manufacturing	953 OMMT

Example 2: Mill B produces bleached kraft pulp to manufacture fine papers and tissue. The mill operates two bleach plants to produce the bleached pulp and two paper machines to manufacture fine papers and tissue. After reviewing the previous five years of data, you find that the sum of bleached kraft pulp, fine papers, and tissue production peaked during the following time period:

Date	Bleach Plant #1 (ADMT/mo)	Bleach Plant #2 (ADMT/mo)	Combined Bleach Plant (ADMT/mo)	Fine Paper (OMMT/mo)	Tissue (OMMT/mo)
1/97	12,500	18,000	30,500	16,000	22,900
2/97	12,700	18,300	31,000	15,750	23,100
3/97	12,300	18,200	30,500	15,400	23,000
4/97	12,300	17,600	29,900	15,300	23,400
5/97	12,900	18,150	31,050	15,800	23,500
6/97	12,100	18,700	30,800	15,650	23,500
7/97	11,800	17,600	29,400	15,750	23,000
8/97	13,000	19,000	32,000	15,100	24,000
9/97	12,500	18,500	31,000	15,950	23,200
10/97	12,700	18,500	31,200	16,250	23,600
11/97	12,900	18,300	31,200	15,800	22,400
12/97	13,150	18,600	31,750	16,250	22,300
Total (ADMT or OMMT/yr)	150,850	219,450	370,300	189,000	277,900
Total Op. days/yr	350	350	350	350	350
Total (ADMT or OMMT/dy)	431	627	1,058	540	794

In their permit application, Mill B provided an 8% and a 4% shrinkage factor for the bleached kraft pulp production data for Bleach Plants #1 and #2, respectively. Based on this information, calculate the production rates for AOX and chloroform as follows:

Bleach Plant #1 = $431 / (1 - 0.08) = 468$ ADMT of unbleached papergrade kraft pulp
 Bleach Plant #2 = $627 / (1 - 0.04) = 653$ ADMT of unbleached papergrade kraft pulp
 Combined Bleach Plants = $468 + 653 = 1,121$ ADMT of unbleached papergrade kraft pulp

The production rates for Mill B are as follows:

Production Rate for combined bleach plants (for AOX permit limits in final effluent)	1,121 ADMT
Production Rate for chloroform for Bleach Plant #1	468 ADMT
Production Rate for chloroform for Bleach Plant #2 (for chloroform permit limits in bleach plant effluent)	653 ADMT
Production Rate of fine paper that results in the maximum conventional pollutants permit limits	540 OMMT
Production Rate of tissue that results in the maximum conventional pollutants permit limits	794 OMMT

Example 3: Mill C produces bleached kraft pulp to manufacture bleached market pulp and fine papers. The mill operates one bleach plant to produce the bleached pulp and one paper machine to manufacture fine papers. The mill has plans to begin operation of a new paper machine in September 2000 to manufacture an additional 200 OMMT of fine paper. At that time, the mill will decrease market pulp manufacture by approximately 20% so that the bleached kraft pulp can be used to increase fine paper production. After reviewing the previous five years of data, you find that the sum of bleach kraft pulp, fine paper, and market pulp production peaked during the following time period:

Date	Bleached Kraft Pulp (ADMT/mo)	Fine Paper (OMMT/mo)	Market Pulp (ADMT/mo)
7/97	26,750	7,900	20,000
8/97	25,800	8,000	20,100
9/97	25,900	8,100	20,350
10/97	26,100	8,000	20,550
11/97	26,015	8,090	20,300
12/97	26,000	8,100	20,415
1/98	25,800	8,300	19,900
2/98	25,700	8,350	20,100
3/98	25,800	8,550	20,400
4/98	25,500	8,100	20,600
5/98	25,600	7,900	20,500
6/98	25,500	7,900	20,700
Total (ADMT or OMMT/year)	309,465	97,290	243,915
Total Op. Days/yr	345	345	345
Total (ADMT or OMMT/day)	897	282	707

Mill C provided an 8% shrinkage factor for the bleached papergrade kraft pulp production data submitted with their permit application. Based on this information, calculate the production rate for AOX and chloroform as follows:

$$897/(1-0.08) = 975 \text{ ADMT of unbleached papergrade kraft pulp entering the bleach plant.}$$

The production rates for Mill C for the noted time period are as follows:

	From Permit Reissuance to 9/00	From 9/00 to Expiration of Permit
Production rate for AOX and Chloroform	975 ADMT	975 ADMT
Production rate of fine papers that results in maximum conventional pollutants permit limits	282 OMMT	482 OMMT
Production rate of market pulp that results in maximum conventional pollutants permit limits	707 ADMT	566 ADMT

How Do I Determine Whether the Mill is Subject to the Specialty-Grade Segment of Subpart E?

To determine whether a mill is subject to ELG&S for the specialty-grade sulfite segment of Subpart E, you must review mill production information. Papergrade sulfite mills subject to ELG&S for the specialty-grade segment produce pulp characterized by a high percentage of alpha cellulose and high brightness sufficient to produce end products such as plastic molding compounds, saturating and laminating products, and photographic papers. (EPA considers a significant portion of production to be 25% or more.) Mills subject to BAT limitations for the specialty-grade segment also include those mills where a major portion (e.g., greater than 50%) of the production is 91 ISO brightness and above. Mills that do not meet these criteria are subject to BAT limitations for the ammonium-based segment or the calcium-, magnesium-, and sodium-based segment, depending on the mill's pulping process. Figure 8-1 illustrates how you must determine a papergrade sulfite mill's appropriate segment.

You should consider the expected production mix at the mill over the full term of the permit. For mills that plan to begin to manufacture products that would require the mill to comply with limitations for the specialty-grade segment, you should establish permit limits that reflect operations for the full permit term. For example, if a mill states that they wish to be considered part of the specialty grade segment but will not meet the production criteria until the last year of a 5-year permit, then they must meet limitations for the appropriate non-specialty grade segment until conversion to specialty grade operations.

Should the Permit Include Limits Based on ELGs or WQBELs?

All receiving waters have water quality standards that are established by the states or EPA that protect the designated uses of the receiving water. After determining the allowable limits based on ELGs, you must compare them to the receiving water's WQBELs. If limits based on ELGs for a particular pollutant result in discharges that exceed the WQBELs for the receiving water, you must establish permit limits that are based on WQBELs (see Section 2 for more information regarding WQBELs).

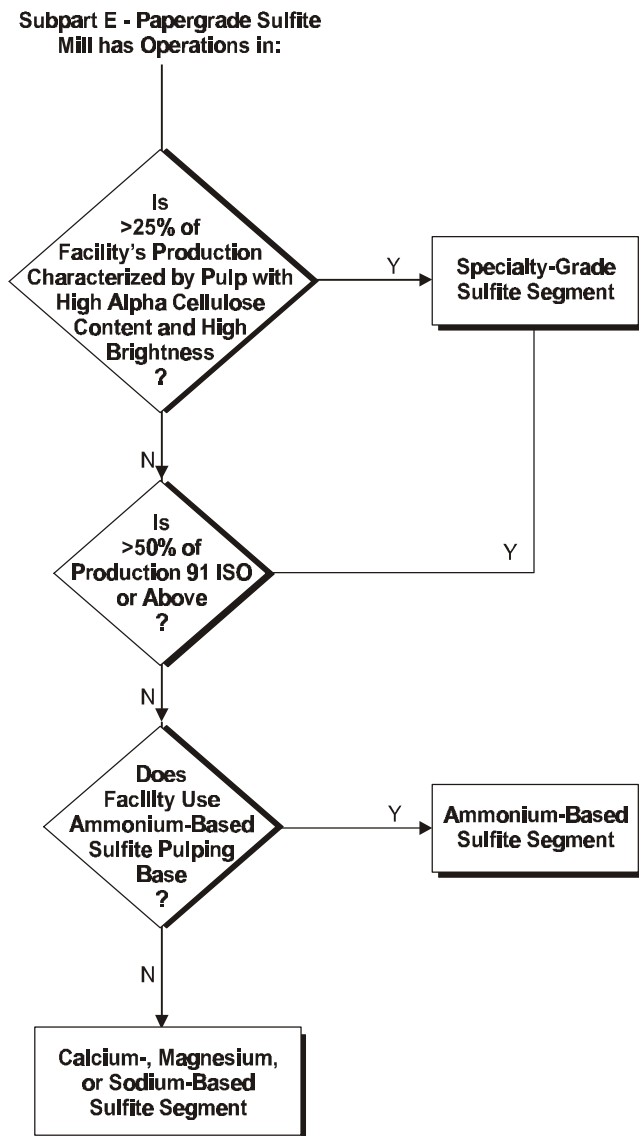
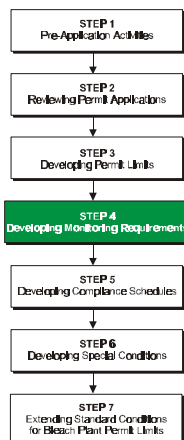


Figure 8-1. Papergrade Sulfite Facility Segment Identification



STEP 4: Developing Monitoring Requirements

- What are the Monitoring Locations?
- What are the Monitoring Frequencies?
- During What Bleaching Conditions Should Mills Collect Samples?
- Should Mills be Required to Measure Bleach Plant Flows?
- What are Appropriate Sample Collection Methods?
- What are the Appropriate Analytical Methods?
- What is the Minimum Level of Detection?
- What are Reporting and Recordkeeping Requirements?
- When May Mills Certify to Use of Certain Processes in Lieu of

Developing Monitoring Requirements

One of your responsibilities is to establish monitoring requirements for mills with operations subject to Subparts B and E. NPDES permits require dischargers to monitor their effluent to ensure that they are complying with permit limitations. As specified in 40 CFR 122.41, 122.44, and 122.48, all NPDES permits must specify requirements for using, maintaining, and installing (if appropriate) monitoring equipment; monitoring frequencies; analytical methods; and reporting and recordkeeping. This section focuses on the following unique aspects of the revised rule:

- How do you specify appropriate in-process monitoring locations?
- What are the required minimum monitoring frequencies?
- What are the required analytical methods and the minimum levels of detection of each method?
- What other process parameters must be monitored to demonstrate that samples are representative?

Note that the mandatory BMPs also have monitoring requirements. These requirements are discussed in Section 9. In addition, those mills enrolling in VATIP have reduced monitoring requirements. The VATIP requirements are presented in Section 10.

What are the Monitoring Locations?

You must require mills to monitor their effluent in order to determine compliance with the ELG&S promulgated by EPA (see Section 6). For direct dischargers who must demonstrate compliance with AOX limits at the final effluent, you may simply require monitoring at the outfall where conventional pollutants are currently monitored. For TCDD, TCDF, chloroform, and the 12 chlorinated phenolic compounds (and AOX at indirect discharges), you must specify bleach plant monitoring locations.

The rule defines bleach plant effluent as “the total discharge of process wastewaters from the bleach plant from each physical bleach line operated at the mill, comprising separate acid and alkaline filtrates or the combination thereof” (40 CFR §430.01). At most mills, wastewaters from acid and alkaline bleaching stages are discharged to separate sewers. For these mills, you should specify a monitoring location for each sewer. The monitoring locations should be situated after the sewers have collected all of the acid or alkaline bleaching stage discharges and before they are mixed with other mill wastewaters. Because chloroform concentrations may change through air stripping as the samples are collected, measured, and composted or through chemical reaction when the acid and alkaline samples are combined, the acid and alkaline monitoring locations should be at the point as close as possible to where bleach plant wastewater is discharged from process equipment. Figure 8-2 illustrates appropriate monitoring locations for separate acid and alkaline streams at a generic mill.

At some mills, bleach plant wastewaters are discharged to a combined sewer containing both acid and alkaline wastewaters. For TCDD, TCDF, and the chlorinated phenolic compounds (and AOX at indirect discharges), compliance with the effluent limitations and standards can be demonstrated by collecting separate samples of the acid and alkaline discharges and preparing a flow-proportioned composite of these samples, resulting in one sample of bleach plant effluent for analysis. In determining the limitations, EPA used data from acid and alkaline bleach plant effluents that had been analyzed separately and also data from combined sewers. Unless prohibited by the mill’s construction, chloroform must be monitored in the separate acid and alkaline streams at the point closest to where bleach plant wastewater is discharged from process equipment. Otherwise, chloroform may change through chemical reaction when the acid and alkaline samples are combined. Figure 8-2 illustrates an appropriate monitoring location for mills that use a combined acid and alkaline sewer.

Alert! Given the wide variety of bleach plant and sewer configurations, you must evaluate mills on a case-by-case basis to determine appropriate monitoring locations.

Mills certifying that they use exclusively TCF bleaching processes are not subject to ELG&S for any chlorinated compounds other than AOX. You may require direct dischargers that certify using exclusively TCF processes to monitor for AOX at the same location where they currently monitor for conventional pollutants, or use your discretion to establish a bleach plant effluent monitoring location. For indirect dischargers making this certification, you must require AOX monitoring at an appropriate bleach plant monitoring location.

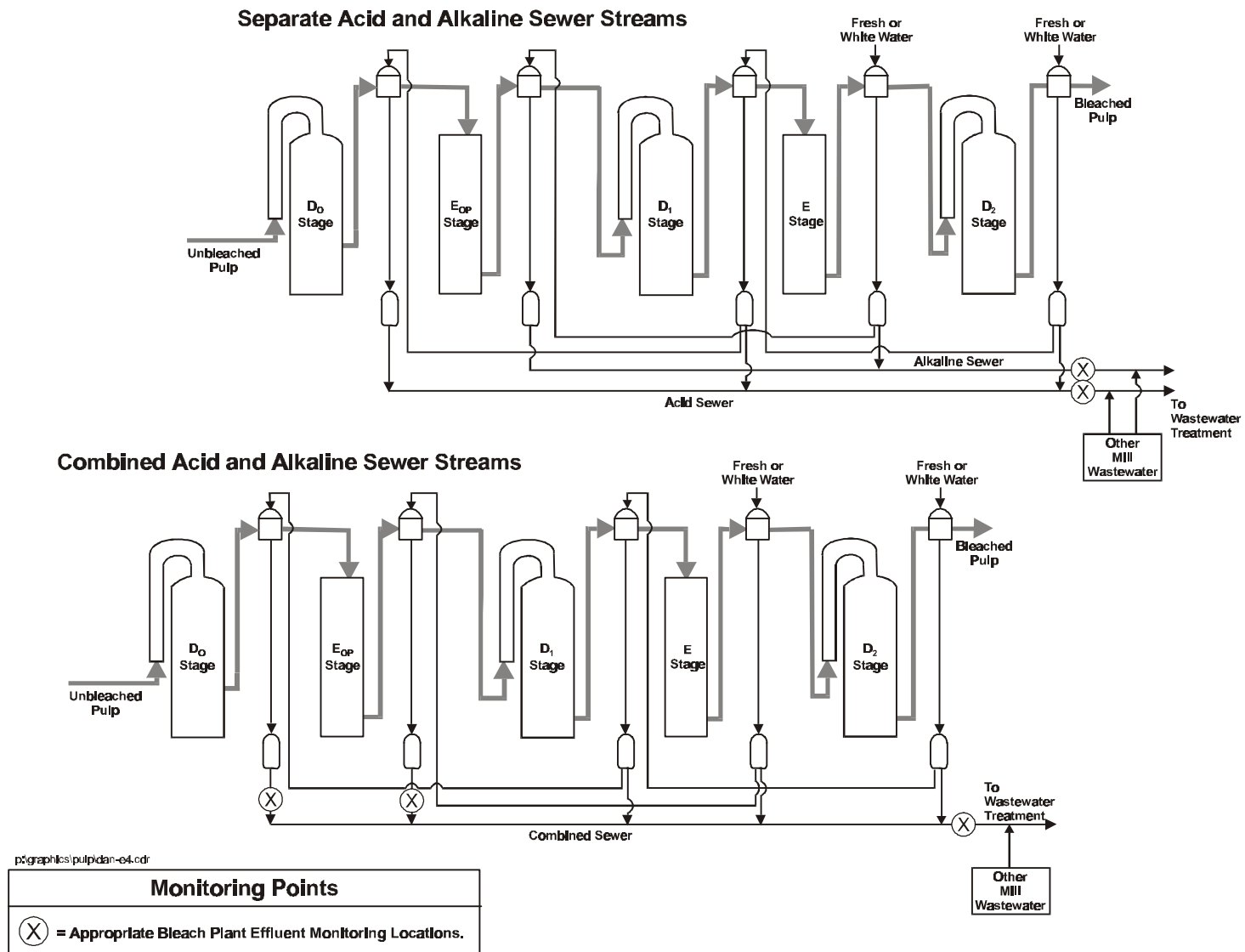


Figure 8-2: Sampling Locations for Various Acid and Alkaline Sewer Stream Configurations

What are the Monitoring Frequencies?

Unlike other ELG&S, the pulp and paper regulations *require* minimum monitoring frequencies for AOX, TCDD, TCDF, chloroform, and 12 chlorinated phenolic compounds, the toxic and nonconventional pollutants regulated under Subparts B and E (see 40 CFR 430.02). You must incorporate these minimum monitoring frequencies in permits for mills subject to those subparts (see Table 8-4 below). For all other pollutants, such as BOD₅ and TSS, you must establish monitoring frequencies in accordance with 40 CFR §122.44(I), using BPJ. You may also use BPJ to specify more frequent monitoring on a case-by-case basis.

Note that you must require mills to monitor at the minimum frequencies shown in Table 8-4 as of the date EPA amends the NPDES Discharge Monitoring Report ICR No. 229 (to be published in the Federal Register; current OMB approval number 2040-0004)). Until then, you must establish monitoring frequencies using BPJ, under 40 CFR §122.41. For indirect dischargers, you must require mills to monitor at the minimum required frequency on or before April 16, 2001.

Mills must monitor at the minimum required frequency for five years (40 CFR §430.02(b)), which is the duration of the permit. This will provide data that will be useful to you in establishing monitoring frequencies in the next revised permit. For direct dischargers, the five-year period is measured from the date the applicable limitations or standards are first included in the discharger's NPDES permit. For existing indirect dischargers, the five-year monitoring period is April 16, 2001 until April 17, 2006. New indirect dischargers must monitor their effluent at the specified monitoring frequencies for five years starting on the date the discharger commences operation.

After the five-year “minimum monitoring period” ends, you may adjust monitoring requirements as you deem appropriate on a case-by-case basis. You should consider the mill's compliance and enforcement history in determining monitoring frequencies. For those mills consistently demonstrating pollutant reductions better than permit requirements, you may establish less frequent monitoring requirements. Conversely, you may consider establishing more frequent monitoring requirements for mills with a poor compliance history.

**Table 8-4: Minimum Monitoring Frequencies for Mills
with Operations in Subparts B and E**

Pollutant	Minimum Monitoring Frequency	
	Non-TCF (a)	TCF (b)
12 chlorinated phenolic pollutants	monthly	(c)
2,3,7,8-TCDD	monthly	(c)
2,3,7,8-TCDF	monthly	(c)
Chloroform	weekly	(c)
AOX	daily	none specified

(a) non-TCF: Pertains to any fiber line that does not use exclusively TCF bleaching processes.

(b) TCF: Pertains to any fiber line that uses exclusively TCF bleaching processes, as disclosed by the discharger in its permit application under 40 CFR §122.21(g)(3) and certified under 40 CFR §122.22, or for indirect dischargers, as reported to the pretreatment control authority under 40 CFR §403.12 (b), (d), or (e).

(c) Limit is not specified for this pollutant.

EPA has issued *The Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies*, which may be useful to you in determining alternative monitoring frequencies at the end of the five-year period. You also may find this guidance useful in setting monitoring frequencies for indirect dischargers.

Because the regulation does not specify a minimum monitoring frequency for mills that certify they use exclusively TCF bleaching processes, you must specify the AOX monitoring frequency based on BPJ (see Section 2). In this case, EPA recommends monthly AOX monitoring. You may wish to include provisions for mills to decrease their monitoring frequency if they demonstrate nonexistent or minimal pollutant discharge.

During What Bleaching Conditions Should Mills Collect Samples?

The ELG&S are based on complete substitution of chlorine dioxide for chlorine and hypochlorite (i.e., ECF bleaching). However, because EPA does not mandate the use of model process technologies you may find some mills use chlorine and/or hypochlorite during bleaching operations while complying with BAT. Compared to chlorine dioxide bleaching, these chemicals generate greater quantities of chlorinated pollutants. A mill's bleaching practices must be considered carefully when determining how the mill should demonstrate compliance with permit limits on chlorinated pollutants in bleach plant effluent.

Section 122.41(j) of EPA's permitting regulations provides that "[s]amples and measurements taken for the purpose of monitoring shall be representative of the monitored activity." Therefore, if a mill's bleaching operations are so variable that samples collected once per month (for TCDD, TCDF, and the 12 chlorinated phenolic compounds) and once per week (for chloroform) may not be representative of all typical mill operations, you must require more frequent monitoring in order to satisfy the requirement of §122.41(j).

Alternatively, you could require sampling at the minimum monitoring frequency for each chlorinated pollutant, but require that the samples reflect the "worst case" condition of the bleach plant effluent with respect to chlorinated pollutants of concern. Note that because, by definition, the "worst case" is not *representative* of the monitored activity, you would need the mill's consent to this monitoring approach. EPA anticipates that when given the choice mills may opt to sample during "worst case" conditions rather than assume the costs of more frequent monitoring.

To determine "worst case" conditions, you should consider the following factors:

1. Chlorine and/or hypochlorite application rates (kg of bleaching chemical/MT of pulp bleached). Mills typically monitor and record information such as chemical application rates in order to optimize and control the bleaching process. You should review these records to select operations that represent "worst case" conditions. For those mills that continue to use chlorine and/or hypochlorite bleaching, you may require monitoring during operations that use these chemicals.
2. Kappa factor (equivalent chlorine ÷ kappa number). The kappa number indicates the lignin content of the pulp. The pulping process removes much of

the lignin and mills generally measure the kappa number after pulping to properly adjust chemical application rates and otherwise optimize bleaching parameters. The lower the kappa number, the lower the required chemical application rate to produce a given pulp quality. Kappa factor is the ratio of chlorine bleaching chemicals applied to the lignin content of the pulp. Use of a lower kappa factor reduces the potential for formation of chlorinated pollutants. High kappa factors may lead to excessive discharges of chlorinated pollutants. You should review mill records to determine what kappa factors represent “worst case” conditions, and consider requiring monitoring during use of those kappa factors.

3. Final product brightness. Greater chemical application rates are required to achieve higher brightness pulps. Typically, higher brightness pulps are produced through the application of increased rates of chlorine dioxide, chlorine, or hypochlorite. You may require monitoring during production of the highest brightness pulps.
4. Other indicators of bleaching intensity. One indicator is the types of furnish. Softwood furnish has a lignin content that is greater than that of hardwood furnish. As a result, softwood furnishes typically require increased bleaching chemical application rates. The type of furnish should be especially important with respect to “worst” case conditions for mills that use “swing” fiber lines. “Swing” fiber lines refer to pulping and/or bleaching systems that are used for both hardwood and softwood furnishes. In selecting “worst case” conditions for a “swing” line, you may require monitoring during worst case conditions for softwood bleaching.
5. Other measures demonstrated to be predictive of effluent pollutant loads. NCASI and IPST, for example, have developed a model that predicts AOX loadings based on inputs such as bleaching chemical application rates, kappa numbers, and type of furnish. This model can be used to determine the combination of bleaching conditions that represents “worst case.” You may consider requiring monitoring during those conditions.

Note that identifying “worst case” conditions may be impossible for mills with extremely variable bleaching practices. For these mills, sampling during “worst case” conditions is *not* appropriate and you should require more frequent monitoring.

Should Mills be Required to Measure Bleach Plant Flows?

EPA strongly recommends that you require mills to *continuously* measure their bleach plant flows as a permit condition. Because the ELG&S for TCDD, TCDF, and the 12 chlorinated phenolic compounds are expressed as concentrations, continuous bleach plant flow measurements will indicate whether increases in bleach plant flow coincide with compliance sampling. Periodic increases in

Note: EPA strongly recommends that you require mills to measure their bleach plant effluent flow as a permit condition.

bleach plant effluent flow that are not representative of mill operations are in violation of Section 122.41(j). EPA included costs to install continuous bleach plant effluent flow measurement as part of the economic analysis for this final regulation. Only in the case where a facility can demonstrate that their flow measurement costs are wholly disproportionate to EPA's estimated costs should you consider continuous flow measurement to be impractical.

To ensure the mill collects samples that are representative of normal operations, you should require mills to:

1. Perform compliance sampling at the appropriate location(s). Appropriate sampling locations are discussed above.
2. Use appropriate flow measurement device(s) at the specified location(s). You will find that few mills with operations in Subpart B and E currently measure their bleach plant flow. Refer to Appendix F for a list of various flow measurement devices available to these mills.
3. Keep records of daily flow measurement records onsite for 3 years so inspectors can determine if samples were collected during normal operations and were representative of typical discharge flow.

What are Appropriate Sample Collection Methods?

In addition to establishing the frequency of compliance monitoring, you must specify the types of samples the mill should collect. This section summarizes the sample collection methods for each pollutant at the point at which compliance must be demonstrated.

You can find more detailed information on sample collection protocols in EPA's Generic Sampling and Analysis Plan for the *U.S. Environmental Protection Agency and Paper Industry Cooperative Long-Term Variability Study*. This plan was written for a sampling effort performed jointly by EPA, the American Forest and Paper Association (AF&P) and the National Council of the Paper Industry for Air and Stream Improvement (NCASI) to collect data necessary to establish the revised rule, and details sample collection methods approved by industry for each pollutant at the appropriate compliance point.

Bleach Plant Effluent

2,3,7,8-TCDD; 2,3,7,8-TCDF; and the Chlorinated Phenolic Compounds (and AOX for indirect dischargers). At each bleach line, mills should collect grab composite samples from both the acid sewer and alkaline sewers. Each composite should be collected every four hours, for 24 hours, from the monitoring location (at the identified tap, valve, or sump) specified in the permit. Mills may use a continuous automated sampling device, if it can be operated reliably at the appropriate monitoring location. Alternatively, mills may prepare one flow-proportioned composite of the acid and alkaline sewer samples (i.e., one bleach plant effluent sample). EPA did receive information during the comment period of the rule related to Method 1653. The commenter reported problems in achieving the Minimum Level in Method 1653 for samples of composited acid and alkaline filtrates. If necessary, to achieve the minimum level, EPA recommends that the facility test the effluents separately for reliable determination of the chlorophenolics, TCDD, and TCDF.

Chloroform. Mills must collect separate samples of acid and alkaline bleach plant filtrates for chloroform analysis. This is to prevent the loss of chloroform through air stripping as the samples are collected, measured, and composited, or through chemical reaction when the acid and alkaline samples are combined. If the mill does not have separate acid and alkaline sewers, they must collect compliance samples at the point closest to the bleach plant that is, or can be made, physically accessible.

Alert! Samples to be analyzed for chloroform require special handling because of chloroform's volatility.

Samples to be analyzed for chloroform should be collected every four hours, for 24 hours. Mills must never collect samples using a continuous automated sampling device because chloroform is volatile. In addition, the following special sampling procedures apply:

1. Samples should be cooled during collection because the bleach plant effluent streams are hot and if collected hot will result in trapped air bubbles in the sample container;
2. Samples should be collected as grabs (6 pairs of samples per 24 hours), 40 milliliters (mL) each from acid and alkaline stream (one set is back-up), which will be composited at the laboratory; and
3. Samples must not contain air bubbles.

Final Effluent

AOX (for direct dischargers). Unless you specify otherwise in the permit, mills may collect samples to be analyzed for AOX as grab samples or continuous automatic composited samples at the same point where the mill is required to monitor for BOD₅, TSS, and pH. If grab samples are appropriate, the mill should collect them every four hours, for 24 hours.

Table 8-5 summarizes recommended sample collection methods for each regulated pollutant. For a more detailed description of suggested sample collection methods, see Appendix B.

Table 8-5: Recommended Bleach Plant Effluent Sampling Collection Methods

Pollutant Monitored	Container	Preservative(a)	Sample Volume	Collection Method
Chloroform	Glass vial with Teflon septum	3 granules (10 mg) $\text{Na}_2\text{S}_2\text{O}_3$ per vial, 2 drops HCl per vial, 4°C	12 x 40 mL each	<ul style="list-style-type: none"> •Grab (2 vials every 4 hours) •24-hour composite prepared by lab
2,3,7,8-TCDD and 2,3,7,8-TCDF	Amber glass bottle with Teflon lid liner	$\text{Na}_2\text{S}_2\text{O}_3$, 4°C	2 x 1,000 mL	<ul style="list-style-type: none"> •Grab (1 every 4 hours) or continuous automatic composite •24-hour composite
Chlorinated phenolic compounds	Amber glass bottle with Teflon lid liner	$\text{Na}_2\text{S}_2\text{O}_3$, H_2SO_4 to pH 2-3, 4°C	3 x 1,000 mL	
AOX	Amber glass bottle with Teflon lid liner	$\text{Na}_2\text{S}_2\text{O}_3$, HNO_3 to pH 2-3, 4°C	500 mL	

(a)Note: sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) is required only if free chlorine is present in the wastewater.

What are the Appropriate Analytical Methods?

Under the permitting regulations at 40 CFR §122.44(I), NPDES permits must require mills to monitor regulated pollutants using the analytical methods approved for those pollutants, under 40 CFR §136. EPA has established analytical methods for each pollutant regulated under Subparts B and E (62 FR 48394, 63 FR 18504 and 18723). Note that Method 1613, for TCDD and TCDF, was promulgated on September 15, 1997 (62 FR 48394). In addition, Method 1650, for AOX, and Method 1653, for chlorinated phenolic compounds, were promulgated as Appendix A to Part 430 (63 FR 18504 and 18723 (April 15, 1998)). These methods will be incorporated into 40 CFR §136 when it is next published. Table 8-6 lists the appropriate analytical test method for each regulated pollutant.

Table 8-6: Analytical Methods

Pollutant	Method	Minimum Level
Tetrachlorocatechol	1653	5.0 µg/L
Tetrachloroguaiacol	1653	5.0 µg/L
Trichlorosyringol	1653	2.5 µg/L
4,5,6-trichloroguaiacol	1653	2.5 µg/L
3,4,6-trichlorocatechol	1653	5.0 µg/L
3,4,5-trichlorocatechol	1653	5.0 µg/L
3,4,5-trichloroguaiacol	1653	2.5 µg/L
2,3,4,6-tetrachlorophenol	1653	2.5 µg/L
3,4,6-trichloroguaiacol	1653	2.5 µg/L
Pentachlorophenol	1653	5.0 µg/L
2,4,6-trichlorophenol	1653	2.5 µg/L
2,4,5-trichlorophenol	1653	2.5 µg/L
2,3,7,8-TCDD	1613	10 pg/L
2,3,7,8-TCDF	1613	10 pg/L
Chloroform (1)	1624B	10 µg/L
AOX	1650	20 µg/L

(1) Other approved EPA methods for chloroform are Methods 601 and 624, and Standard Methods 6210B and 6230B.

What is the Minimum Level of Detection?

For various pollutants, EPA has established ELG&S that are expressed as less than the Minimum Level (<ML). You must require mills to demonstrate compliance with those limitations and standards using the methods and ML values specified in the regulations, as reproduced in Table 8-6. Mills cannot demonstrate compliance using an analytical method with an ML above that of the designated method.

The ML specified for each method is the lowest level at which laboratories calibrate their equipment. To do this, laboratories use standards (i.e., samples at several known concentrations). Calibration is necessary because laboratory equipment does not measure concentration directly; but generates signals or responses from analytical instruments that must be converted to concentration values. The calibration process establishes a relationship between the signals and the known concentration values of the standards. This relationship is then used to convert signals from the instruments for samples with unknown concentrations. In the calibration process, one of the standards will have a concentration value at the ML for the pollutant analyzed. Because the ML is the lowest level for which laboratories calibrate their equipment, measurements below the ML are to be reported as <ML.

Often, laboratories report values less than ML as “not detected” or “<ML.” In some cases, however, the laboratories quantify these values. For example, even though the ML for an approved analytical method is 10 ppq for a particular pollutant, a laboratory might report a measurement of 4 ppq. These are two situations where a laboratory might report such a value. In

the first situation, the laboratory could have used the method specified but referred to the measurement as “detected” although it was <ML. The second situation could occur in the future as analytical methods become more sensitive than the specified analytical method, allowing laboratories to reliably measure values less than today’s MLs. Such measurements would demonstrate compliance with the <ML limitations codified for Subparts B and E, because these measurements are less than the ML defined in Part 430 for Subparts B and E.

When reviewing monitoring data, you need to distinguish between laboratory results that demonstrate compliance and those that do not. A sample-specific ML greater than the method ML will not demonstrate compliance. Such sample-specific MLs may result from sample volume shortages, breakage or other problems in the laboratory, or failure

Alert! A sample-specific ML greater than the method ML will not demonstrate compliance. Such sample-specific MLs may result from sample volume shortages, breakage or other problems in the laboratory, or failure to properly remove analytical interferences from the sample. These situations can be avoided if mills carefully adhere to proper sample collection methods

to properly remove analytical interferences from the sample. You should stress to mills that all of these situations can be avoided if they carefully adhere to proper sample collection methods (see Appendix B for detailed sample collection methods) and laboratory analysis procedures.

The table below provides some examples demonstrating compliance with <ML limitations.

Example: The ML for Test Method 1613 is 10 ppq. Do the following laboratory results demonstrate compliance if the ELG&S requires <ML?

Is concentration reported as “detected” or “not-detected” in the sample?	Value reported by laboratory (ML in these examples is 10 ppq)	Does the sample demonstrate compliance?	Explanation for compliance determination
Detected	4 ppq	Yes	4 ppq is less than the ML specified.
Detected	10 ppq	No	Compliance is demonstrated with measurements less than the ML specified.
Detected	11 ppq	No	The measured value is greater than the ML specified.
Not detected	<5 ppq	Yes	<5 ppq is less than the ML of 10 ppq specified.
Not detected	<10 ppq	Yes	Compliance is demonstrated for all values less than the ML specified.
Not detected	<11 ppq	No	The sample-specific ML must be less than the ML of 10 ppq specified.

What are Reporting and Recordkeeping Requirements?

In accordance with Section 122.44(i)(2), you must require mills to report the results of compliance monitoring at least once per year. You may require mills to submit the results of more frequently if you wish. As a result of new monitoring requirements for mills with operations in Subpart B and E, the reports:

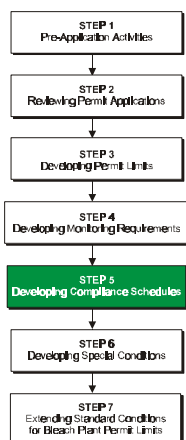
1. Must include results of monitoring at the bleach plant for 15 chlorinated pollutants;
2. Must include results of monitoring final effluent for AOX (bleach plant effluent for indirect dischargers);
3. Must include BMPs reporting (discussed in Section 9); and
4. Should include continuous bleach plant flow measurements.

All monitoring records must be kept for a period of at least 3 years and made available to inspectors.

When May Mills Certify to use of Certain Processes in Lieu of Monitoring?

Mills that certify in their permit application that they use exclusively totally chlorine-free (TCF) bleaching processes (40 CFR §430.02(a) and (c)-(e)) are not subject to minimum monitoring frequencies. EPA believes it is appropriate to exclude TCF mills from minimum monitoring requirements for chlorinated compounds because EPA does not expect TCF bleaching processes to produce chlorinated compounds. The mill would need to notify you if in the future they decide to use chlorinated chemicals in the bleach plant operations (following a certification as TCF). In that event, you must reopen the permit and establish new permit limits that reflect the new process and include minimum monitoring frequencies. Mills entering the Voluntary Advanced Technology Incentives Program (VATIP) also qualify for reduced monitoring frequencies. For details, see Section 8 and Section IX.B.2 of the Preamble (63 FR 18609-18610).

EPA has proposed to allow mills to demonstrate compliance with chloroform limitations by certifying that they use ECF bleaching processes (63 FR 18796). If this proposal is promulgated, you may reduce or eliminate chloroform monitoring at some mills. Final action has not been taken on this proposal as of the date of publication of this document.



STEP 5: Developing Compliance Schedules

- When Must Existing Mills Comply With Cluster Rules?
- What if Existing Direct Discharges Cannot Meet Cluster Rules Immediately?
- What are Typical Implementation Periods for Subpart B Model Process Technologies?
- Compliance Schedule Examples.
- When Must New Sources Comply with the Cluster Rule?
- How Do Compliance Schedules of the Air and Water Components of the Cluster Rule Overlap?

Developing Compliance Schedule

When Must Existing Mills Comply With Cluster Rules?

For direct dischargers, you must establish NPDES permits that contain chlorinated pollutant permit limits based on the newly promulgated BAT ELGs on the date the NPDES permit is issued. Under the Clean Water Act, the NPDES permit must require immediate compliance with those new limitations (see CWA Section 301(b)(2)(C)-(F)). Therefore, as a matter of law, NPDES permits cannot include a compliance schedule for the achievement of the new chlorinated pollutant permit limits.

For indirect dischargers, however, the Clean Water Act imposes different compliance requirements. Under CWA Section 307(b)(1), existing indirect dischargers must comply with applicable pretreatment standards by the date specified in such standards, with the time for compliance not to exceed three years from the date of promulgation. As specified in the regulation, existing indirect dischargers subject to Subparts B or E must comply with pretreatment control limits based on the newly promulgated PSES on or before April 16, 2001 (see 40 CFR §430.26(a) and §430.56(a)).

What if Existing Direct Dischargers Cannot Meet Cluster Rules Immediately?

EPA strongly urges you to require mills to meet permit limits for all pollutants on the date the NPDES permit is issued. Since the statutory deadline for BAT passed in 1987, Agency guidance has stressed the importance of prompt modification of permits to incorporate more stringent limitations, focusing on those facilities that are not already in compliance with the new effluent limitations guidelines or on water bodies not complying with water quality standards. The technology basis of the final rule, ECF bleaching, was key to the proposed rule, published December 17, 1993, and has not changed since that time. Therefore, the industry has been on notice regarding ECF bleaching for more than five years. Mills have had little reason to delay all compliance activities until the final rule was signed (November 14, 1997) and no reason to delay any compliance activities beyond that date. Allowing other mills to receive additional time is unfair and undermines the effectiveness of the VATIP. For all practical purposes, most facilities

are capable of demonstrating compliance within this time-frame. In fact, some mills already employ several (or all) of the model process technologies that form the basis of BAT.

Some mills, however, may indicate that they need additional compliance time to implement several (or all) of the model process technologies to comply with the new ELGs for chlorinated pollutants. For these mills, you may exercise your enforcement discretion by either: 1) issuing a punitive order with a daily fine that accumulates or escalates over time until the mill comes into compliance; or 2) issuing an administrative order accompanying the permit that authorizes additional time for compliance.

You should evaluate requests for additional compliance time on a case-by-case basis. You should work closely with each facility, reviewing all materials and data that supports a mill's decision to implement a technology. (EPA reiterates, however, that a mill whose permit is reissued after April 15, 1999, is unlikely to be able to make a reasonable case that it needs additional time for compliance in view of the length of time it has been on notice of the BAT requirements to which it would be subject.)

What are Typical Implementation Periods for Subpart B Model Process Technologies?

Remember, EPA does not mandate the implementation of specific model process technologies to achieve the ELGs. Rather, mills currently incapable of achieving the effluent limitations and guidelines and standards may choose to implement any process technology or effluent controls that will enable the facility to comply with permit limits. Therefore, in the rare instances when additional compliance time is appropriate, you need to understand the basis for the additional time. To do this, you need to understand the implementation requirements of each model process technology to help you establish an appropriate administrative order for additional compliance time. You also need to determine how much progress the facility has made in implementing a process upgrade. They may have completed engineering studies and the procurement process. In this case, they would not need the complete time discussed below. (Note: mills may implement other process technologies. In this case, you should review mill plans to determine an appropriate administrative order.)

Of the model process technologies that form the basis of the revised regulation, the following may require significant implementation time in some cases:

- 100% substitution of chlorine dioxide;
- Effective brown stock washing;
- Closing brown stock pulp screen room;
- Elimination of hypochlorite;
- Oxygen and peroxide enhanced extraction; and
- High shear mixing.

You should note that the minimum implementation time associated with the model process technologies that require construction activities is at least 6 months. This minimum implementation time allows for sufficient engineering studies that must be performed prior to construction. Some process technologies, such as installation of oxygen and peroxide enhanced extraction, do not need extensive procurement and construction periods. For several of the process technologies, however, such as new brown stock washing systems, new chlorine dioxide towers, or

oxygen delignification systems, fabrication of appropriate equipment designed to meet the mill's specific requirements may require up to a year. However, facilities may expedite implementation schedules by performing most of the site construction activities while they are waiting for their equipment to be fabricated and delivered.

Oxygen delignification is not one of the model process technologies that forms the basis of BAT; however, a facility may decide to install oxygen delignification to ensure it meets environmental regulations and to benefit from reduced operating costs. Consequently, a discussion of the time necessary to install oxygen delignification is included in this section.

Table 8-7 summarizes reasonable implementation times for the EPA model process technologies that require significant time. The major construction elements of each model process technology are also included in the table. The information discussed is based on actual project data collected by EPA. These time requirements are discussed in detail, below. You should note that the time periods shown in Table 8-7 are for individual process technologies. In those cases, where more than one major process technology is necessary, the time periods presented are not necessarily additive and should be adjusted when appropriate phases of these projects can be combined.

100% substitution of chlorine dioxide. Full implementation of 100 percent substitution could take between 12 to a maximum of 24 months from the time that preliminary engineering studies are started. The amount of time depends on the scope of the project. If a facility currently uses 50 percent chlorine dioxide substitution, the facility may only need to expand the capacity of the existing chlorine dioxide generator, which will take not more than 12 months. For a facility that employs less than 50 percent substitution, the mill could need 18 months to replace (or augment) the existing chlorine dioxide generator with a new chlorine dioxide generator with increased capacity. A facility that does not perform any chlorine dioxide substitution could need 24 months to construct a new chlorine dioxide generator and to install chlorine dioxide bleaching towers with appropriate metallurgy. As a general guide, 50% substitution distinguishes mills that need to expand the chlorine dioxide generator from mills that need to install a new unit. A few pre-1970 mills operate chlorine dioxide generators, such as R-2, Mathieson or Solvay processes. These mills may require up to 18 months to install a new chlorine dioxide generator to replace the outdated equipment.

Effective brown stock washing. Facilities may decide to upgrade brown stock washing systems or install new brown stock washing systems to minimize the amount of pulping liquor carried over to the bleach plant with the pulp. Facilities that decide to upgrade existing brown stock washing systems by adding an extra stage to the existing washing equipment are capable of implementing this modification within 18 months from the time that preliminary engineering studies are started. Facilities that decide to completely replace the existing washing system could need up to 24 months.

Closed brown stock pulp screen room. Some facilities may opt to close the screen room to optimize wash water use and to prevent the overflow of decker filtrate to the sewer. Some facilities configure a closed screen room so that it operates like an extra brown stock washing stage. Installation of this model process technology at most facilities could be accomplished in less than 12 months.

Elimination of hypochlorite. Facilities that perform hypochlorite bleaching could need up to 24 months to engineer and implement bleaching changes that allow elimination of hypochlorite. For some facilities, particularly those with short bleaching sequences that do not use chlorine dioxide at all (e.g., CEH), eliminating hypochlorite may require replacement of the hypochlorite bleaching tower with a new chlorine dioxide tower, washer, and auxiliaries made of materials resistant to the more corrosive environment of chlorine dioxide bleaching. Some facilities may be able to modify the bleaching chemical additions to other stages (i.e., adding oxygen and/or peroxide to the first extraction stage) and abandon the hypochlorite stage, rather than replacing it. This may apply to mills with a CEHDED-type of bleaching sequence. This change may be accomplished in a matter of months, with little or no procurement and construction time.

Oxygen and peroxide enhanced extraction. Facilities may opt to install oxygen and/or peroxide enhanced extraction (Eo, Ep, or Eop) equipment to eliminate hypochlorite bleaching or to reduce the amount of chlorine dioxide required for bleaching. Installation of oxygen and peroxide enhanced extraction can take up to 8 months because of the need to install either an upflow extraction tower or a downflow tower preceded by a small upflow pre-retention tube to supply pressurized oxygen.

High shear mixing. To realize the full benefits of 100 percent chlorine dioxide substitution, oxygen-enhanced extraction, and oxygen delignification on the bleach plant effluent quality, the pulp and bleaching agents must be well-mixed and the chemical addition rate controlled as precisely as possible. New mixers are normally installed when mills increase chlorine dioxide substitution to 100%, install oxygen enhanced extraction, and/or install oxygen delignification. No additional installation time is necessary for installing new mixers because they are integral parts of the aforementioned upgrades.

Oxygen delignification. Facilities with outdated process equipment that face major process changes to comply with the regulations may decide to install oxygen delignification. To implement this technology, facilities need to install an oxygen reactor (with appropriate mixing and control) for use prior to the chlorine dioxide bleaching stages. In addition to the reactor, facilities need to include a post-oxygen washing system and oxidized white liquor equipment. Design and installation of oxygen delignification can be completed in 24 months. Concurrent upgrades in brown stock washing and screening are often required, and can be implemented in the same time frame. (Note: facilities that decide to install this process technology may enter the Voluntary Advanced Technology Incentives Program discussed in Section 8, which provides extended compliance time.)

Permitting authorities should note that Subpart B facilities do not need time to implement the following model process because these technologies do not require construction, have been implemented throughout the industry within the past few years, or have been part of industry operation for many years (i.e., biological treatment):

- Use of TCDD- and TCDF-precursor-free defoamers;
- Use of strategies to minimize kappa; and
- Efficient biological wastewater treatment.

Table 8-7: Model Process Technologies that Typically Need Significant Implementation Time

Model Process Technology	Major Construction Elements (a)	Reasonable Project Duration
100% Chlorine Dioxide Substitution		
a) >50% substitution at a mill that uses an R3 or SVP generator	· upgrade existing chlorine dioxide generator to expand capacity.	12 months
b) <50% substitution (or mills that do not use R3 or SVP generators that need to increase capacity)	· installation of new chlorine dioxide generator · upgrade mixing and process control systems · additional ClO ₂ storage facilities	18 months
c) 0% chlorine dioxide use on mill site.	· installation of new chlorine dioxide generator, including sodium chlorate unloading and storage facilities · upgrade mixing and process control · additional ClO ₂ storage facilities · installation of new corrosion- resistant chlorine dioxide bleaching tower	24 months
Effective Brown Stock Washing Systems		
a) Upgrade existing system	· installation of extra washing stage	18 months
b) Installation new system	· installation of new process unit (including screens)	24 months
Closed Screening Room	· replace atmospheric screens with pressure screens	12 months
Elimination of Hypochlorite		
a) 1) (CD)EHD, or similar, for softwood furnish 2) bleaching sequences with two H stages and only one, or no, chlorine dioxide stages 3) CEH	· replace H stage with D stage · installation of corrosion-resistant chlorine dioxide bleaching tower · mixing and process control systems	24 months
b) (CD)EHDED, or similar	· increase bleaching chemical in other stages to compensate for the elimination of H	0 months
Oxygen and Peroxide Enhanced Extraction	· installation of upflow extraction tower or a downflow tower preceded by a small upflow retention tube · high shear mixers	8 months
Oxygen Delignification	· oxygen reactor · post-oxygen washing system · mixing and control systems · white liquor oxidizing equipment	24 months

(a) Does not include minor elements such as pumps, fans, piping, etc

Compliance Schedule Examples

The text box below presents several examples of how you may determine compliance schedules for Subpart B existing dischargers. For the purposes of these examples, it is assumed that facilities will implement all model process technologies that are not currently in place.

The table below presents the status of five example mills:

Mill	Effective BSW?	Closed Screening Room?	EC/OD?	Bleach Sequence	% ClO ₂ Substitution
A	N	N	N	CEH	0%
B	N	N	N	D/CEHDED	45%
C	Y	Y	N	D/CED	65%
D	N	Y	N	DEDED	100%
E	Y	Y	N	DEopDD	100%

The table below shows the model process technologies the mills will implement, assuming that the mills decide to implement all of the model process technologies. The table includes an estimate of the amount of time that probably would be needed in order to implement the processes, from initiation of preliminary engineering studies to commissioning of equipment.

Model Process Technology	Mill A	Mill B	Mill C	Mill D	Mill E
100% Substitution	✓	✓	✓		
Effective Brown Stock Washing	✓	✓		✓	
Closed Screening Rooms	✓	✓	✓	✓	
Eliminate H	✓	✓			
Eop	✓	✓	✓	✓	
Oxygen Delignification	✓(a)				
Compliance Time Frame	≤24 months	≤18 months	≤12 months	0-24 months (b)	0 months

(a) Because Mill A faces significant process changes to comply with BAT, Mill A decided to install oxygen delignification to benefit from reduced operating costs and further environmental improvement. The mill may decide to enroll in VATIP to take advantage of an extended compliance time.

(b) Mill D may be able to meet BAT limitations because the mill employs complete substitution; therefore, immediate compliance with new regulation would probably be appropriate. However, if the mill demonstrates installation of upgraded or new brownstock washing systems are required to meet AOX ELG, an appropriate compliance schedule could be 12 to 24 months.

When Must New Sources Comply with the Cluster Rules?

The owner or operator of a new source subject to Subpart B or E must install and have in operating condition, at “start up,” all pollution controls necessary to meet the applicable NSPS/PSNS before beginning discharge. The mill must meet permit limitations based on those standards within 90 days of commencing discharge (see 40 CFR §122.29(d)(4)).

How Do Compliance Schedules for Air and Water Regulations for Pulp and Paper Mills Overlap?

Mills with operations in Subparts B and E must comply with air regulations, as well as the ELG&S. Under Maximum Achievable Control Technology (MACT) - based NESHAPs, these mills must reduce air emissions from bleaching systems, pulping systems, and kraft pulping process condensates. EPA has developed compliance schedules for air regulations that provide sufficient time for mills to resolve the cross-media technical issues. This section discusses the compliance schedule issues that overlap for MACT and BAT. For more information on the applicability of the MACT rules, see *The Pulp and Paper NESHAP: A Plain English Description*.

Bleaching Systems

Mills with operations in Subparts B and E must comply with the air regulations established for bleaching systems by April 15, 2001. Because many mills will modify their bleaching processes to comply with BAT and PSES, EPA feels this three-year compliance period provides individual mills enough time to install air controls subsequent to installing any appropriate bleaching process equipment. To comply with MACT requirements, mills must achieve a 99% reduction of all chlorinated hazardous air pollutants (HAPs), except chloroform, by installing closed vent systems on the bleaching system.

The MACT technology basis for chloroform emission control is complete chlorine dioxide substitution and elimination of hypochlorite bleaching. As discussed earlier, these two process changes are also integral elements of the technology basis for the effluent limitation guidelines and standards. As a result, mills must demonstrate compliance with the chloroform emission standards by meeting the applicable BAT and PSES effluent limitations guidelines and standards.

For mills entering VATIP, bleaching system compliance requirements are relaxed by up to three additional years so that these mills are required to demonstrate compliance no later than April 15, 2004 (see Section 9).

Pulping Systems

Mills with operations in Subparts B and E are allowed under the air regulation up to eight years to install controls for high-volume/low-concentration (HVLC) gas streams from the kraft pulping process, which include HVLC gases collected from brownstock washing systems and oxygen delignification (40 CFR §63.440). Although oxygen delignification is not included as part of the BAT technology basis, EPA established an eight-year compliance period to encourage mills to install advanced pollution prevention technologies to reduce toxic air emissions and water pollutant discharges from pulping processes.

Kraft Pulping Process Condensates

Some mills may opt to use biological treatment (i.e., “hard-piping”) as an option to comply with the standards established for kraft pulping condensates by April 15, 2001. The air regulations

require these mills to achieve a 92% reduction in HAPs by weight. By sending kraft pulping condensates to the wastewater treatment plant, mills will contribute loadings of conventional pollutants, particularly BOD₅, to the wastewater treatment plant. However, you *should not* adjust conventional pollutant limitations that are based on BPT and a mill's production.

Note that mills choosing this option must conduct a third type of monitoring program at the wastewater treatment plant. In addition to performing final effluent monitoring and BMP monitoring (see Section 8), these mills must conduct wastewater treatment monitoring to ensure 92% HAPs reduction as required by 40 CFR §63.453.

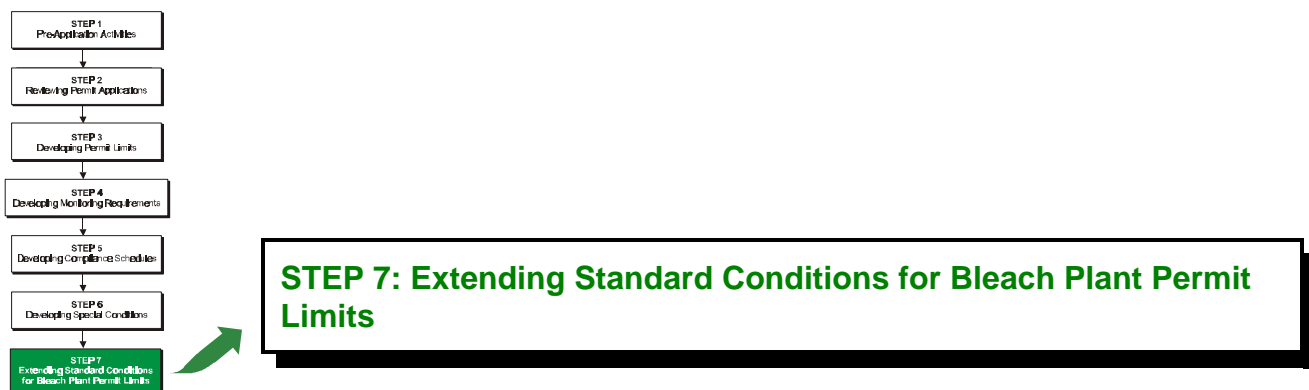


Developing Special Conditions

Special conditions are included in permits to require facilities to implement additional non-numerical measures of control that reduce pollutant discharges. EPA recommends that you include the following two special conditions in the permit of each mill with operations in Subparts B and E:

- 1) Reopener clause. A reopener clause does not provide an additional measure of control. However, by including a reopener clause in permits, you may revise a permit at any time during its duration to include more stringent numerical limits during the term of the permit. This is especially important for:
 - a) COD permit limits for mills with operations in Subpart B and COD, chloroform, and AOX permit limits for mills with operations in Subpart E. EPA has reserved ELGs for these pollutants at this time. EPA suggests that you establish permit limits for these pollutants using BPJ or, at a minimum, require mills to perform monthly monitoring and report the results. Where a facility has current COD effluent data, a BPJ permit limit could be set using the existing COD discharge concentrations. Monitoring of effluent COD is recommended so that you will have a basis (and baseline data) for developing a COD limit for the mill in the future and to provide COD data for helping the mill to develop a pollution control strategy. When EPA promulgates ELGs for these pollutants, the reopener clause will allow you to revise the permits to include limits based on ELGs.
 - b) VATIP requirements (for those mills choosing to enroll). Mills enrolling in VATIP will rebuild and update their pulping and bleaching operations. By including the reopener clause in permits, you may update limits to reflect improved effluent quality that results from these more extensive voluntary mill renovations. This is discussed in more detail in Section 10.

- 2) BMP requirements. Mandatory BMPs are included in 40 CFR 430. Therefore, permits for mills with operations in Subparts B and E must include BMP requirements as a special condition. For a discussion of BMPs, refer to Section 9. Appendix C presents sample language that you may include in the permit.



Extending Standard Conditions for Bleach Plant Permit Limits

EPA’s permitting regulations provide standard conditions (i.e., “boiler plate” conditions) that are typically included in permits. These conditions, which are found in Section 122.41 and 122.42, include legal, administrative, and procedural requirements of the permit that support the numeric permit limits. Because mills with operations in Subparts B and E are subject to ELGs that require compliance in bleach plant effluent, EPA recommends you extend the following standard conditions to include situations specific to bleaching process operations at these mills:

- 1) Require daily bleach plant flow measurements to ensure mills do not achieve compliance with their permit limits by increasing their bleach plant effluent flow rate during monitoring. Daily flow measurements will enable inspectors to determine whether monitoring occurred during representative mills operations. You should require mills to keep records of these measurements for three years.
- 2) Extend upset provision covered under 122.41(n) to include pulping and bleaching process upsets that affect compliance with bleach plant permit limits. Section 122.41(n) defines an upset as “an exceptional incident in which there is an unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee.” Because some of the ELGs require compliance in bleach plant effluent, process upsets that affect pulping and bleach plant operations are subject to upset provisions. Upset provisions are *not* meant to cover improper operation and maintenance, but to provide relief in the event of unusual, unforeseen circumstances over which the mill operator has no control. A few process upsets that could affect pulping and bleach plant operations that would be covered under this provision include:
 - a) major power outages,
 - b) tank failure due to metal fatigue,
 - c) flooding of operations, and
 - d) lightning strikes.

For a list of additional standard conditions that may apply to the facility you are permitting, you may refer to Chapter 9 of the U.S. EPA NPDES Permit Writer’s Manual (EPA-833-B-96-003).